GC/MS Training Checklist

1. **Introduction to the GC/MS instrument**
   - **Injector**-Factors affecting volatility: Boiling Point Temperature (B.P.), Base v. salt forms (including Na salts), Injector Schematics and Split Ratio Concept
   - **Column**-Factors affecting separation: Relationship between B.P., Oven Temperature, Column Sample Delivery Techniques, Interaction with Liquid Phase, Separation Efficiency -Column ID, Length and Film Thickness
   - **Ion Source**: How Sample is Ionized and focused to mass filter, Source Schematics
   - **Quadrupole**: Mass filter creates stabile trajectory for one m/z ratio, scans mass range by incrementally varying the electric field.
   - Working knowledge of **Chemstation** method creation, specifically method acquisition parameters and method integration. Review Library Searches and Data Analysis features to diagnose problems.

2. **Chemical fate of Drug after GC/MS**
   - EI spectrum of Drug is the base form, Molecular Ion not always present
   - Parent compound plus artifacts
   - Artifact(s) only, including Dehydration product (-H2O) or parent compound minus functional group, ie –SO2, -CH3, etc
   - Reactive with solvent

3. **Limitations of GC/MS**
   - Compounds must be volatilized by the GC
   - Possibility of Thermal Breakdown or solvent reactivity
   - Will not determine salt forms or distinguish between enantiomers
   - Identification of unknowns normally limited by libraries searched and reference books: Review Clarke's and Pfleger Reference books.
   - Library match quality not always accurate using purchased libraries: reason for user created library.

4. **Ability to Qualify Instrument for Use**

   A. Instrument Quality Control:
   - Standard Spectra Tune for Correct Mass Assignment, Unit Mass Resolution, and Standardized Relative Ion Abundances.
   - Ability to interpret Tune Report and determine when maintenance is required.

   B. Method Quality Control
   - Blanks
   - QC Mix- To assess injector, column suitability for use and verify Tune Report.
   - Standards consistent with QC Folder

5. **Understand GC/MS Protocol**
   - Sample Submission Requirements and Chain of Custody
   - Batch Setup Procedures
   - Knowledge of the different methods, when/why they are used and which standards to use
   - QA/QC Requirements: Tune Interpretation/approval , QC Mix documentation, Protocol for Requesting New Standard, Documenting Maintenance Logbook, Report when standards in circulation are not consistent with QC folder, Report Library Search Problems for future accuracy
   - Acceptance Criteria for Retention Time and Mass Spectral Matches
   - Working knowledge of Data Analysis: Use of background subtraction, PBM Searches and Nist Searches, Extracted Ion Chromatogram, Manual Integration, Data retrieval and Processing
   - Analysis of Unknown Samples
   - Protocol for Documenting Results and GC/MS Sample History
   - Data Storage.

6. **Basic Skills in Maintenance and Troubleshooting**
   - Syringe Replacement
   - Injection Port liner maintenance and daily injector maintenance
   - Leak Detection
   - Column Replacement and Conditioning
   - Filament Selection, Ion Source Cleaning and Maintenance
   - How to Use an Ohm Meter to Check Filaments, Heaters, Sensors, etc for Continuity.
   - Changing Tanks